Riparian wetlands and storage – March 22
This would be added to the explanation of the hydrology function of *providing storage*

Riparian wetlands and storage

The storage provided immediately adjacent to streams in wetlands mapped as R reflects some conditions that make it unlike storage in non-riparian wetlands. While R wetlands—and the stream channel itself—can hold water from rainstorms or snowmelt, the storage they provide is generally very short term—stored for only a day or two. What happens is that as rainfall or snowmelt enters the stream, and stream levels start to rise, some of this rising channel flow moves into streambank soils (see Figure B in Section 3.4.6) and adjacent R wetlands; then as channel flows begin to drop, water moves back into the channel from these streambanks and wetlands. The hyporheic zone around the channel (see Figure 2.2c in Section 2.2.3) may also expand, both outwards, downwards, and upstream, which provides more short-term storage. How much the zone expands depends on the permeability of the material through which the stream flows—in the northern half of the Kenai lowlands, most channels flow through permeable gravelly substrates, so large volumes of water can leak from the channel as channel flows rise; south of Kasilof, poorly sorted glacial till and impermeable layers (like coal seams) can restrict enlargement of the hyphorheic zone. Again, the water that moves into streambanks, R wetlands, and the hyporheic zone will generally drain back into the stream very quickly as stream levels drop and hydraulic gradients reverse.

Although of short duration, the storage provided by stream channels and adjacent R wetlands plays important roles in "de-synchronizing" and attenuating the downstream movement of floodwaters (see the discussion of "hydrologic buffering" above). Even short-term storage helps desynchronize the arrival of floodwaters at any one downstream location, spreading out the arrival of flows over time. This lowers (or attenuates) flood peaks. (In addition, the ongoing back-and-forth exchange of water between R wetlands, streambanks, the hyporheic zone, and the stream channel itself is fundamentally important in determining the physical conditions in and along the stream, which in turn shapes the habitats on which salmon and other aquatic species depend.)

The degree to which even this short-term storage occurs depends on how much moisture is already held in streambank soils and adjacent wetlands when stream levels start to rise. If after a relatively dry stretch of spring or summer weather, a storm or snowmelt period occurs somewhere further upstream of a particular stretch of R wetlands, then these wetlands, including streambanks and hyporheic zone, can have considerable capacity to absorb the flows arriving from upstream. If, on the other hand, the storm or meltoff occurs locally, then the R wetlands will fill with rainfall or snowmelt even as the stream itself starts rising. This means that less of the channel flow will be able to move into what are now already saturated streambanks and wetland areas. So, as in any other wetland, "antecedent moisture" is key in determining how much short-term storage will be available in any R wetland at any time. Once the available storage in R wetlands has been maxxed out—meaning the soils, topographic depressions, plant litter, etc. are all holding as much water as they can—any water moving through the adjacent channel on its way downstream will just keep going, all of it channel runoff.

To reflect these conditions and processes, R wetlands in the upper 1/3rd of their watersheds received a mid-range score for storage. These upper watershed locations receive the highest volumes of precipitation and snowmelt, so even the short-term storage provided by these small, numerous, widely distributed headwater streams and adjacent R wetlands is significant. What's more, the benefits of storage in these upper reaches of a watershed are particularly important because they're amplified moving downstream as the effects from many headwater areas combine and aggregate. (And remember, although only R wetlands in the upper 1/3rd of their watersheds receive any points for providing storage, all R wetlands score high in the water quantity functions of *transmitting discharge* and *maintaining natural (unregulated) flow regimes* and in the water quality functions of *maintaining water quality* and *reducing shoreline and streambank erosion*.)